

**I. INTRODUCTORY REMARKS**

By this amendment, the independent claims have been amended to require a transmitter comprising an output stage that generates a monocycle pulse. A filter spectrally modifies the monocycle pulse to create a spectrally modified ultra wideband signal having more zero crossings than the monocycle pulse in the time domain. An antenna coupled to the filter radiates the spectrally modified ultra wideband signal. The claims are fully supported by the specification of the instant application which discloses the emitted signal(s) 1012 being spectrally modified by filtering of monocycle pulses to cause each monocycle pulse to have more zero crossings in the time domain. (see for example, paragraph [00121].

Accordingly, no new matter has been added. Claim 24 and 32 are canceled. Upon entry of this Amendment, claims 23, 25, 27-31, 33, 34, and 36-42 are pending in the application. The Applicants thank the Examiner for the careful consideration of this application. Based on the following remarks, the Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections, and that they be withdrawn.

**II. CLAIM OBJECTIONS**

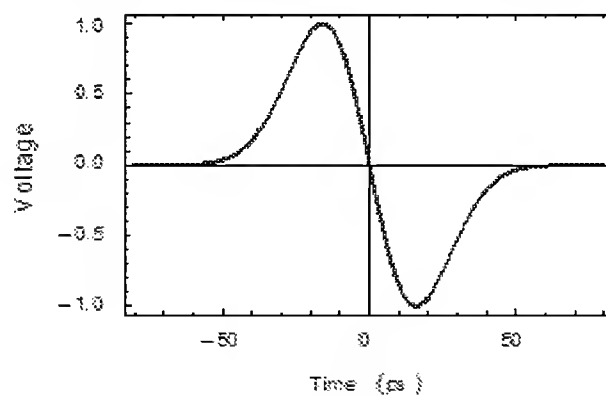
On pages 2-3 of the Office Action, claims 23-25, 27-34, and 36-42 are objected to as the word “create” is suggested to be changed to “create an output...” to clarify the present invention. According, Applicants have amended claims 23, 31, and 40 to recite language regarding creating a spectrally modified monocycle pulse having more zero crossings than the monocycle pulse in the time domain. Therefore, Applicants respectfully request withdrawal of the objection.

**III. REJECTION UNDER 35 U.S.C. §112**

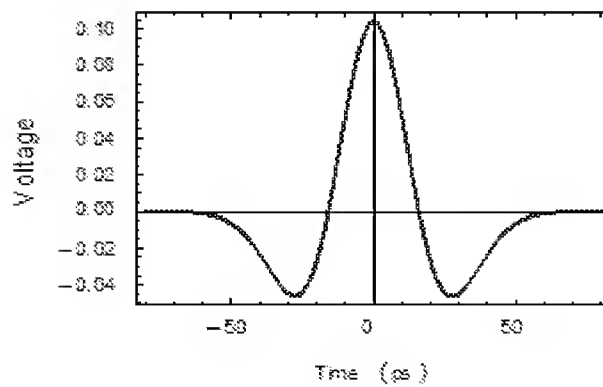
On pages 3-4 of the Office Action, claims 23-25, 27-34, and 36-42 are rejected under 35 U.S.C. §112, first paragraph, as failing to comply with the enablement requirement. The Office Action asserts that the specification appears to merely provide the result of a band pass filter that modifies a monocycle pulse to have more zero crossings in the time domain without explaining the performance and/or operation of a band pass filter in such a way as to enable one skilled in the art to which it pertains to make and/or use the invention.

In paragraph [0121], the specification of the instant application states "the emitted signal(s) 1012 can be spectrally modified by filtering of monocycle pulses. This bandpass filtering will cause each monocycle pulse to have more zero crossings in the time domain." Applicants respectfully submit that based on the Specification, a person skilled in the art would recognize that filtering a monocycle pulse, which is an ultra-wideband signal, could involve a wide varieties of topologies including capacitive, inductive and resistive elements depending on the application. The oldest forms of electronic filters are passive analog linear filters, constructed using only resistors and capacitors or resistors and inductors. These are known as RC and RL single-pole filters respectively. More complex multipole LC filters have also existed for many years, and their operation is well understood. (see, [http://en.wikipedia.org/wiki/Electronic\\_filter](http://en.wikipedia.org/wiki/Electronic_filter)).

The specification shows a monocycle pulse in Fig. 1 of the specification, reproduced below as Fig. A. Fig B shows a spectrally modified/filtered monocycle pulse that has more zero crossings than the monocycle pulse of Figure A. Knowing the well understood function and operation of filters and based on the specification, one of ordinary skill in the art could therefore apply the disclosed monocycle pulse in the specification to arrive at the spectrally modified signal that has more zero crossings than the original mono-cycle pulse as shown in Fig. B below.



**Figure A**

**Figure B**

Accordingly, the claims are enabled because, based on the specification, a person of ordinary skill in the art at the time of filing of the application would have understood how to spectrally modify a monocycle pulse to create a spectrally modified monocycle pulse having more zero crossings in the time domain than the original monocycle pulse. Applicants respectfully request that the rejection be withdrawn.

#### **IV. REJECTION UNDER 35 U.S.C. §103**

At the outset it is noted that this Amendment is written in view of the Supreme Court's decision in *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1396 (2007) and the recently published *USPTO Examination Guidelines Update: Developments in the Obviousness Inquiry After KSR v. Teleflex*, 1358 O.G. 372 (September 28, 2010), hereinafter referred to as the "KSR Guidelines," which according to the Federal Register became effective September 1, 2010, after mailing of the Office Action by the USPTO. Based on the foregoing, it is respectfully submitted that the USPTO has not established a prima facie case of obviousness for the rejection of claims based on prior art references, including Fullerton alone or in combination with any other reference. Specifically, the USPTO and Office Action fail to meet the *Graham* factors in support of an obviousness rejection, as re-emphasized in the *KSR* decision. *See MPEP §2141*. The Office Action does not 1) correctly determine the scope and content of the prior art, 2) properly ascertain the differences between the claimed invention and the prior art of record and, thus, does not 3) articulate a rational underpinning to support the legal conclusion of obviousness.

According to *KSR*, the analysis supporting a rejection under 35 U.S.C. §103 should be made explicit. MPEP § 2143. The Federal Circuit has stated that "***rejections on obviousness cannot be sustained with mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.***" *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006). *See also KSR*, 82 USPQ2d at 1396 (quoting Federal Circuit statement with approval). As stated in MPEP §2142, the key to supporting any rejection under 35 U.S.C. §103 is the clear articulation of the reasons why the claimed invention would have been obvious. *See KSR Guidelines* at 381. The scope of the claimed invention must first be clearly determined by giving the claims the "broadest reasonable interpretation consistent with the specification." *See* MPEP §2141; *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316, 75 USPQ2d 1321, 1329 (Fed. Cir. 2005).

Office personnel fulfill the critical role of fact-finder when resolving *Graham* inquiries. *See* MPEP §2141. It must be remembered that while the ultimate determination of obviousness is a legal conclusion, the underlying *Graham* inquiries are factual. *Id.* According to the *KSR Guidelines*, when setting forth an obviousness rejection, Office personnel are to continue to make appropriate findings of fact as explained in MPEP §§ 2141 and 2143, and must provide a reasoned explanation as to why the invention as claimed would have been obvious to a person of ordinary skill in the art at the time of the invention. *Id.* at 375. This requirement for explanation remains even in situations in which Office personnel may properly rely on intangible realities such as common sense and ordinary ingenuity. *Id.* Factual findings made by Office personnel are the necessary underpinnings to establish obviousness. *See* MPEP §2141.

Cognizant of accurate fact finding, Applicants once again submit that the claimed invention requires a transmitter comprising an output stage that generates a monocycle pulse, filter that spectrally modifies the monocycle pulse to create a spectrally modified ultra wideband signal having more zero crossings than the monocycle pulse in the time domain, and an antenna coupled to the filter that radiates the spectrally modified ultra wideband signal.

On pages 4 and 5 of the Office Action, claims 23-25, 27-34, and 36-42 are rejected under 35 U.S.C. §103 as being unpatentable over U.S. Patent No. 4,641,317 to Fullerton (hereinafter

“Fullerton”) in view of U.S. Patent No. 4,578,653 to Howell (hereinafter “Howell”). The Office Action correctly states that Fullerton fails to teach or suggest “a filter that spectrally modifies the monocycle pulse to create a spectrally modified ultra wideband signal having more zero crossings than the monocycle pulse in the time domain.” Indeed, Fullerton not only does not teach or suggest the filter, but also it does not teach or suggest generating a mono-cycle pulse. Looking at FIG. 4 of Fullerton, none of the shown waveforms (A-L) comprise a mono-cycle pulse. The Applicants submit that the USPTO's proper fact finding under the *Graham* inquiry should lead to the conclusion that Fullerton fails to teach or suggest two claimed elements: 1) monocycle pulses and 2) a filter that spectrally modifies the monocycle pulse.

To overcome the deficiencies of Fullerton, the Office Action relies on Howell. However, Howell also fails to teach a monocycle pulse. As shown in Figs. 5A-C, Figs. 10A-C, and described in col. 7, lines 45-58 of Howell, input signal waveforms are transformed into square waveforms. Square waveforms are not monocycle pulses. Rather, such square waveforms serve as the inputs to a time domain filter, which either outputs a reproduced waveform or no signal depending on the frequency of the square waveforms.

The Office Action relies on Howell to teach or suggest the claimed filter, and aligns the time domain filter of Howell with the claimed filter. Howell does not teach or suggest a filter that spectrally modifies a monocycle pulse to create a spectrally modified ultra wideband signal having more zero crossings than the monocycle pulse in the time domain for at least the following two reasons. First, Howell does not provide any teaching or suggestion that its time domain filter modifies a monocycle pulse to create a spectrally modified ultra wideband signal **having more zero crossings** than the monocycle pulse in the time domain simply because Howell provides no mention of a monocycle pulse. Rather, the time domain filter of Howell only outputs a square waveform that reproduces the input into the time domain filter, or outputs no signal. Howell, Figs. 5A-5B and col. 4, lines 17-18 and 27-29 (“seen by the output waveform 39C that no signal is present” and “waveform 38B and provides a reproduction of the input waveform”). Thus, the time domain filter of Howell does not create more zero crossings than in an original monocycle signal because the time domain filter only reproduces input signals and Howell provides no mention of monocycle pulses. Second, as Howell's time domain filter can only be used with square waveforms, it could not possibly teach or suggest a filter that spectrally modifies a monocycle pulse as claimed.

Further, as mentioned above, Howell provides no mention of the claimed monocycle pulse which is spectrally modified. Accordingly, Howell does not teach or suggest a filter that spectrally modifies a monocycle pulse to create a spectrally modified ultra wideband signal having more zero crossings than the monocycle pulse in the time domain.

Therefore, the rejection of claims based on the combination of Fullerton and Howell fails to make the claimed invention obvious under proper fact finding. As mentioned above, both the Office Action and Applicants agree that Fullerton does not teach or suggest the claimed filter. However, under a proper fact finding analysis described above, Howell also does not teach or suggest a filter that spectrally modifies a monocycle pulse to create a spectrally modified ultra wideband having more zero crossings than the monocycle pulse in the time domain. Rather, Howell teaches a time domain filter that only receives and outputs square waveforms, whereby the output is either a reproduction of the input or no signal. In contrast, the claimed invention requires a filter which spectrally modifies a monocycle pulse to create a spectrally modified ultra wideband signal having more zero crossings than the monocycle pulse in the time domain. Further, as discussed above, neither Fullerton nor Howell teach or suggest generating monocycle pulses.

Accordingly, at least two proper difference between the claimed invention and both prior art of record is that the claimed invention recites generating a monocycle pulse, and recites a filter which spectrally modifies the monocycle pulse to create a spectrally modified ultra wideband signal having more zero crossings than the monocycle pulse in the time domain. Because the Office Action has not properly ascertained the differences between the claimed invention and the prior art of record, the Office Action's could not properly resolve the level of ordinary skill in the art under Graham inquiry. As described above, at least two proper difference between the claimed invention and both prior art of record is that the claimed invention recites generating a monocycle pulse, and a filter which spectrally modifies the monocycle pulse to create a spectrally modified signal having more zero crossings than the monocycle pulse in the time domain. Since neither Fullerton nor Howell teach or suggest generating a monocycle pulse, or a filter which spectrally modifies the monocycle pulse to create a spectrally modified ultra wideband signal having more zero crossings than the monocycle pulse in the time domain, there is no possible rational underpinning to support the legal conclusion of obviousness that Fullerton and Howell, alone or together, teach or suggest

the ascertained differences between the claimed invention and the prior art of record. Accordingly, Applicants respectfully request the withdrawal of the rejections for at least the foregoing reasons.

Claims 31 and 40 are independent claims and recite similar language to independent claim 23 and are patentable over Fullerton and Howell for at least the foregoing reason. Claim 31 recites “generating a monocycle pulse” and “spectrally modifying the monocycle pulse to create a spectrally modified ultra wideband signal having more zero crossing than the monocycle pulse in the time domain.” Claim 40 recites “generating a monocycle pulse” and “filtering the monocycle pulse to create a filtered ultra wideband signal having more zero crossings than the monocycle pulse in the time domain.” Thus, Applicants respectfully request reconsideration and withdrawal of the rejection.

Claims 25, 27-30, 33, 36-39, 41, and 42 depend variously from claims 23, 34, and 40, which as demonstrated above, are patentable over Fullerton and Howell for at least the foregoing reason. Claims 24 and 32 are newly canceled, rendering their rejection moot. Thus, Applicants respectfully request reconsideration and withdrawal of the rejection.

### **Conclusion:**

Applicants respectfully submit that in view of the foregoing, all of the stated grounds of objection and rejection have been properly accommodated, traversed, or rendered moot. Therefore, the Applicants respectfully request that the Examiner reconsider the presently outstanding rejections and that they be withdrawn.

If the Examiner believes, for any reasons, that further communication will expedite prosecution of this application the Examiner is invited to telephone the undersigned at the number provided.

Applicants believe there are no additional fees associated with this reply other than those indicated. However, if this is incorrect, the Commissioner is authorized to charge any fees that may be required for this paper to Deposit Account No. 22-0261.

Respectfully submitted,

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